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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/630,097

07/29/2003

Jeffrey D. Hooker

03-0077.01

8484

21491 7590 05/01/2008  
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EXAMINER

CHORBAJI, MONZER R

ART UNIT

PAPER NUMBER

1797

MAIL DATE

DELIVERY MODE

05/01/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/630,097	<b>Applicant(s)</b> HOOKER, JEFFREY D.	
	<b>Examiner</b> MONZER R. CHORBAJI	<b>Art Unit</b> 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 29 March 2007.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-5,8,10-14 and 36-44 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5,8,10-14 and 36-44 is/are rejected.
- 7) ☒ Claim(s) 15 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 7/29/03&7/26/04 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

**This final action is in response to the amendment received on 3/29/07**

### ***Claim Objections***

1. Claims 15-35 were canceled in the amendment dated 10/31/05. Applicant's current amendment listed claim 15 as "original" and 16-35 as "withdrawn". This is incorrect. Examiner will not treat claim 15 in this action, as it is canceled. Claim 15 may be reinstated only as a new claim with a new claim number. See MPEP 714.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. Claims 1-5 and 36-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brown et al (U.S.P.N. 5,288,619) in view of Ergun et al (U.S.P.N. 6,440,057).

Regarding claim 1, Brown discloses an apparatus (figure 5:100) that includes the following: a first tank with a first outlet (unlabeled outlet of tank 102 in figure 5), a second tank with a second outlet (unlabeled outlet of tank 104 in figure 5), a third tank with a third outlet (unlabeled outlet of tank 106 in figure 5), one inlet pipe (figure 5:108) coupled to the first, second and third outlets, a reaction chamber (figure 5:110) having an inlet in its bottom (unlabeled end of pipe 108 at the bottom of reaction chamber 110 in figure 5) that is connected to the inlet pipe, an outlet in the top portion (unlabeled outlet of reaction chamber 110 in figure 5) of the reaction chamber, a natural gravity separatory connected to the outlet of the reaction chamber (figure 5:120) that is capable of receiving transesterified emulsion and a centrifuge connected to the outlet of the natural gravity separator (figure 13:14 and col.66, lines 50-53). Brown fails to teach placing an ultrasonic device in the reaction chamber.

Ergun teaches equipping directly (considered directly coupling) the reaction chamber with an ultrasound device (figure 1:8, col.7, lines 59-62 and col.8, lines 54-58) that is capable of creating a transesterified emulsion, since ultrasound results in enlarging boundary surfaces among reactants that decreases reaction times therefore producing greater amounts of transesterified oils (col.3, lines 4-13). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Brown's reaction chamber by directly equipping it with an ultrasound generator, since ultrasound results in enlarging boundary surfaces among reactants that decreases reaction times, therefore producing greater amounts of transesterified oils as explained by Ergun (col.3, lines 4-13).

Regarding claims 2-5 and 36-39, the tanks of Brown are capable of holding various types of liquids including fatty acids, or vegetable oils, or concentrated alkaline solutions, or alcohols at various volumes and concentration ranges.

5. Claims 8, 10-14 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brown et al (U.S.P.N. 5,288,619) in view of Ergun et al (U.S.P.N. 6,440,057) as applied to claims 1, 39 and further in view of Perkins, JR (U.S.P.N. 2,447,529).

Regarding claims 8 and 12, Brown and Ergun fail to teach providing a cooling jacket to their reaction chambers. Perkins places multiple jackets around various reaction chambers (for example, 57 and 58 in figure 1 and col.7, lines 53-70) that are capable of heating or cooling the reaction mixture within the chamber to various temperatures. In addition, Perkins reaction chambers are capable of operating under various pressure values including from 1.0-5.0 atmospheres. It would have been obvious to one of ordinary skill in the art at the time of the invention to further modify the Brown/Ergun modified reaction chamber by equipping it with a jacket in order to maintain the reaction mixture within a desired temperature range as explained by Perkins (col.7, lines 63-67).

Regarding claims 10-11, Brown fails to teach placing an ultrasonic device in the reaction chamber. Ergun teaches placing an ultrasound in his reaction chamber (figure 1:8, col.7, lines 59-62 and col.8, lines 54-58). In addition, Ergun's ultrasound generator is capable of producing ultrasonic energy at frequencies of between 20-50 KHz and is also capable of providing ultrasonic energy at power densities of between 18-65 Ws/ml.

Art Unit: 1797

It would have been obvious to one of ordinary skill in the art at the time of the invention to further modify Brown's reaction chamber by placing an ultrasound generator within in it as taught by Ergun since ultrasound results in enlarging boundary surfaces among reactants that decreases reaction times (Ergun, col.3, lines 4-13) therefore producing greater amounts of transesterified oils.

Regarding claims 13-14, Brown's natural gravity separator is capable of separating various transesterified emulsion mixtures and also, Brown's centrifuge is capable of removing traces of catalysts, or residual alcohol or glycerol, or any various residual components by washing and drying.

Regarding claim 40, Brown fails to teach providing a cooling jacket and ultrasound generator to his reaction chamber. Ergun teaches placing an ultrasound in his reaction chamber (figure 1:8, col.7, lines 59-62 and col.8, lines 54-58), but fails to teach equipping the reaction chamber with a cooling jacket. Ergun's ultrasound generator is capable of producing ultrasonic energy at frequencies of between 20-50 KHz and is also capable of providing ultrasonic energy at power densities of between 18-65 Ws/ml. Perkins places multiple jackets around various reaction chambers (for example, 57 and 58 in figure 1 and col.7, lines 53-70) that capable upon intended use of heating or cooling the reaction mixture within the chamber to various temperatures. In addition, Perkins reaction chambers are capable of operating under various pressure values including from 1.0-5.0 atmospheres and also, Perkins jackets are capable of maintaining the reaction chamber temperature between 70-80° C. It would have been obvious to one of ordinary skill in the art at the time of the invention to further modify

Art Unit: 1797

Brown's reaction chamber by placing an ultrasound generator within in it as taught by Ergun since ultrasound results in enlarging boundary surfaces among reactants that decreases reaction times (Ergun, col.3, lines 4-13) therefore producing greater amounts of transesterified oils and to further equip Brown's reaction chamber with a jacket as taught by Perkins in order to maintain the reaction mixture within a desired temperature range (Perkins, col.7, lines 63-67).

**6.** Claims 41-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Perkins, JR (U.S.P.N. 2,447,529) in view of Martin (U.S.P.N. 5,395,593).

Regarding claim 41, Perkins discloses a system that includes the following: supply tanks (figure 1:50-51) that are capable of holding various types of fluids directly supplying to a common conduit (figure 1:142), a reaction chamber (figure 1:123) having an inlet in its bottom (figure 1:123 and 130) coupled to the common conduit, the reaction chamber being encased in a jacket (figure 1:52 and col.7, lines 63-68) that is capable of maintaining the reaction chamber temperature between 70-80° C, an outlet in the top portion of the reaction chamber (figure 1:123 and 122), a separatory coupled to the reaction chamber outlet (figure 1:123, 122, 142, 134 and 71). Furthermore, Perkins reaction chambers are capable of operating under various pressure values including from 1.0-5.0 atmospheres. Perkins fails to teach placing an ultrasonic horn extending into the interior of the reaction.

Martin places an ultrasonic horn (figure 3:96) extending into the interior of a processing vessel (figure 3:70) such that it is immersed in a liquid for directly imparting ultrasonic energy (figure 3:24) to the treated liquid (col.5, lines 4-9) since such energy is

Art Unit: 1797

known to impart chemical and physical changes to the liquid including emulsification (col.1, lines 19-22). It would have been obvious to one of ordinary skill in the art at the time of the invention to further modify Perkins's reaction chamber by placing an ultrasound generator within in it, since such energy is known to impart chemical and physical changes to the liquid including emulsification as explained by Martin (col.1, lines 19-22).

Regarding claims 42-44, the tanks of Perkins are capable of holding various types of liquids including fatty acids, or vegetable oils, or animal oils, or alkaline solutions, or alcohols.

#### ***Remarks***

7. The claim objection cited on page 2 of the office action dated 12/27/06 has been withdrawn, since Applicant on page 12 of the amendment section has properly assigned number 44 to the previously unnumbered claim.

#### ***Response to Arguments***

8. Applicant's arguments filed on 03/29/2007 have been fully considered but they are not persuasive.

On pages 15-30 of the Remarks section, Applicant argues that there is no motivation to combine Brown and Ergun references; that the proposed combination of Brown and Ergun would not work; that the examiner provided no clear and particular evidence that reducing the reaction time through enlargement of reactant boundary layers is contemplated in an enzymatic transesterification reaction; that the ultrasound of Ergun would render the process by Brown useless; and that those skilled in the art



recognize that high intensity ultrasound denatures enzymes making such substances less reactive.

As previously shown above, the motivation for modifying Brown's apparatus to include an ultrasound generator, because ultrasound results in enlarging boundary surfaces among reactants that decreases reaction times, therefore producing greater amounts of transesterified oils as explained by Ergun (col.3, lines 4-13). Brown and Ergun uses transesterification in their apparatuses and one of ordinary skill in the art would recognize that the benefit of applying ultrasound energy reduces reaction times while it may possibly depending on its value, raise the temperature of the reaction mixture such that the skilled artisan would also recognize to maintain the proper temperature values that do not lead to denaturing the enzymes of Brown. Furthermore, the limitations of the instant apparatus claims are met by that the modified apparatus of Brown and Ergun is capable of operating the enzymatic reaction mixture below its denaturing temperature while decreasing reaction times by using ultrasound energy.

Applicant's arguments are very much tied to the process. It is noted that applicant's claims are drawn to an apparatus or system. The apparatus claims are examined based on structure – which is met by the combination of references.

Applicant further argues that Ergun does not teach how to add an ultrasonic generator to the reactor. Examiner believes that one of ordinary skill in the art would be capable of determining the specifics of such an incorporation. It is sufficient that Ergun suggests that an ultrasonic generator is desirable in such a process/apparatus.

### ***Conclusion***

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

10. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MONZER R. CHORBAJI whose telephone number is (571)272-1271. The examiner can normally be reached on M-F 9:00-5:30.

12. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill Warden can be reached on (571) 272-1267. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1797

**13.** Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jill Warden/  
Supervisory Patent Examiner, Art Unit 1797

/M. R. C./

Application/Control Number: 10/630,097  
Art Unit: 1797

Page 11

Application/Control Number: 10/630,097  
Art Unit: 1797

Page 12